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<b>(21) International Application Number:</b> PCT/EP93/01007 <b>(22) International Filing Date:</b> 26 April 1993 (26.04.93)  <b>(30) Priority data:</b> 874,608      27 April 1992 (27.04.92)      US  <b>(71) Applicant:</b> RHONE POULENC AGROCHIMIE [FR/ FR]; 14-20, rue Pierre-Baizet, F-69009 Lyon (FR).  <b>(72) Inventors:</b> HODAKOWSKI, Leonard ; 8205 S. Crestwyck Court, Raleigh, NC 27615 (US). GOUGE, Samuel ; 1708 Parkridge Way, Raleigh, NC 27614 (US). KNUDSEN, Glenn ; 5016 Springwood Drive, Raleigh, NC 27613 (US). Mc EVOY, Steven ; 3921 San Bernado Drive, Jack- sonville, FL 32217 (US).		<b>(74) Agent:</b> BRACHOTTE, Charles; Rhône Poulenc Agrochi- mie, DPI, BP 9163, F-69263 Lyon Cédex 09 (FR).  <b>(81) Designated States:</b> CA, JP, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> PACKAGING FOR HAZARDOUS COMPOSITIONS  <b>(57) Abstract</b>  The present invention relates to a containerization system comprising at least one inner water soluble bag located within an outer water insoluble bag. The inner water soluble bag contains an agrichemical that does not substantially dissolve the bag. The outer water insoluble bag is flexible and collapsible and has a low stretchability; it is made of laminated polypropylene (outer layer) polyethylene (inner layer).		

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## PACKAGING FOR HAZARDOUS COMPOSITIONS

5           This application is a continuation-in-part of U.S. Serial n° 08/020.506  
filed on February 22, 1993, which is continuation-in-part of U.S. Serial n°  
87/874 608 filed on April 27, 1992.

BACKGROUND OF THE INVENTION

## I.     Field of the invention

10           The invention relates to a containerization system and to containers  
which are particularly suitable for storing, packaging and transporting fluid  
agricultural chemical compounds, such as pesticides and concentrates thereof.

## II.    Discussion of the Prior Art

15           At present, most hazardous and toxic liquids are stored in metal drums  
or, where smaller quantities are involved, in plastic containers. Hazardous  
compositions, especially agricultural chemicals (agrichemical), are formulated  
in various compositions.

20           Agrichemicals in liquid form, particularly in the form of concentrates,  
are most convenient for farmers because of the relative ease with which they can  
be handled. There are, nevertheless, difficulties in handling such liquid  
compositions. There is a danger of spillage or leakage if holes develop in  
containers that are accidentally dropped and thereby crack or fail. Containers  
have been developed which possess great resistance to impact and shock. While  
such containers are secure under normal storage and handling conditions, in the  
25           event of an accident, for example during transporting, there remains an  
appreciable risk of spillage or leakage with rapid loss of liquid. Leakage of toxic  
and hazardous chemicals can create damage to the environment.

30           The chemical and packaging industries have long sought a secure  
container which provides a sufficient safeguard for those handling it, such as  
farmers and transporters, as well as adequate protection for the environment.

It is known, for example, to package agrochemicals in soluble bags or sachets made from water soluble films. While considerable effort has been made and tremendous success in improving the strength of such bags, there still remains problems with the fragility of such bags resulting from sudden impact, for example from dropping.

One solution for this problem is exemplified in patent application WO 89/12590 where a water soluble bag containing a liquid agrichemical composition is encased in an outer container made of rigid or semi-rigid polymer such as polypropylene. Currently, there is a product available commercially in France called Geludose (Ciba-Geigy) which is also a water soluble bag which is stored in a rigid polymeric container. U.S. patent 3,892,905 describes water soluble packages. In that patent, overwraps are described such as single layer polyolefins cellophane glassine, foils, PVC, waxed paper and the like or combinaisons of those as laminates. However the intended use of these and the selection criteria for these were base on the ability of these compositions to protect the inner bag from water or humidity contact. The only examples actually offered by the patent is a cellophane overwrap. Such external container may also break under violent shock and the broken container may have edges which may cut the water soluble bag which is inside of it.

In its working example, the prior art describes a container wherein the outer container comprises a rigid body-part (which contains the inner bag, i.e. the area within which the bag can move and a shock absorbing rigid part separated from the body part by mean of shoulder, or shock absorbing stripes wherein the inner bag cannot move and/or deform completely. In other words, a body part which is actually the outer container and another added shock absorbing part which is not part of the outside container.

When designing containers for protecting objects having a degree of fragility, rigid materials are the first choice despite the high cost compared with many flexible polymers.

An object of the instant invention is to provide a new containerization system to contain hazardous chemicals which is safe for everybody because of its increased resistance to leakage.

5 Another object of the instant invention is to provide a new containerization system to contain agrichemicals which is easy for the farmer to manipulate.

Another object of the instant invention is to provide a new containerization system to contain agrichemicals which is as much condensed as possible, using the least amount of space.

10 Another object of the instant invention is to provide a new containerization system to contain agrichemicals which is easy to open, easy to manufacture (and thus cheap), and which has a good shock absorption, that is to say, which has a good resistance to shock as impact and blows.

15 Another object of the instant invention is to provide a new containerization system to contain agrichemicals which is stable both at high and low temperatures.

Another object of the instant invention is to provide a new containerization system and/or a new method to contain agrichemicals which diminishes the risks of pollution.

20 A further object of the present invention is to provide a containerization system which has no lids, and is easier and cheaper to manufacture and has no problem of lids coming off.

A further object of the present invention is to provide a new containerization for agrichemicals which reduces the waste disposal of contaminated containers and overpacks.

25 A further object of the present invention is to provide a new containerization system for agrichemicals which allows very efficient packing and storing due to flexible, optionally flat bags.

30 Other objects of the invention will better appear from the following description.

## CLAIMS

What is claimed is :

- 5           1.    A containerization system which comprises an inner water soluble bag containing a hazardous composition wherein the inner bag is contained in a sealed outer bag, the walls of the outer bag comprising a laminate of an outer layer of polypropylene and an inner layer of polyethylene.
- 10           2.    A containerization system, according to claim 1, wherein the hazardous composition is an agricultural composition.
3.    A containerization system, according to claim 1, wherein the overwrap has a low stretchability.
4.    A containerization system, according to claim 1, wherein the  
15   inner dimension is no more than 15% greater than the outer dimension of the inner bag.
5.    A containerization system, according to claim 4, wherein the inner dimension is no more than 10% greater than the outer dimension of the inner bag.
- 20           6.    A containerization system, according to claim 5, wherein the inner dimension is no more than 5% greater than the outer dimension of the inner bag.
7.    A containerization system, according to claim 1, which has a low stretchability and the inner dimension are no more than 15% of the outer  
25   dimension of the inner bag.
8.    A containerization system, according to claim 1, which comprises a tearing tab.
9.    A containerization system, according to claim 1, which has an elongation at rupture of less than 100%.
- 30           10.   A containerization system, according to claim 1, wherein the thickness is from 20 to 500 microns.

11. A containerization system, according to claim 1, wherein the thickness is 30 to 100 microns.

12. A containerization system, according to claim 1 or 2, wherein the composition is a solid.

5 13. A containerization system, according to claim 1 or 2, wherein the composition is a fluid.

14. A containerization system, according to claim 1, wherein the composition is a gel.

10 15. A containerization system according to anyone of claims 1 to 14 wherein the agrichemical is selected in the group comprising plant protection agents, pesticides, insecticides, fungicides, herbicides, acaricides, nematocides, plant growth regulators, plant nutrients, or an adjuvant for the activity for plants as activity promoters including penetrating agents, synergists, antidotes, sticking agents, spreaders, activators, compatibility agents; adjuvants for the water  
15 soluble bags as plasticizers.

16. A containerization system according to anyone of claims 1 to 14 wherein the water soluble polymeric film constituting the inner bag comprises polyethylene oxide or methylcellulose, or polyvinylalcohol.